

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **OXYGEN (Compressed or Liquified)**

CAS Number: 7782-44-7

DOT Number: UN 1072 (Compressed)
UN 1073 (Refrigerated Liquid)

RTK Substance number: 1448

Date: April 1986 Revision: May 1997

HAZARD SUMMARY

- * Contact with liquid **Oxygen** can cause severe skin and eye irritation and burns as well as frostbite.
- * Liquid **Oxygen** forms explosive mixtures with organic and other readily oxidizable materials.
- * Breathing pure **Oxygen** at high pressures can cause nausea, dizziness, muscle twitching, vision loss, convulsions (fits), and loss of consciousness.
- * Breathing pure **Oxygen** for a longer time can irritate the throat and lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

IDENTIFICATION

Oxygen is a colorless, odorless gas. Liquid **Oxygen** has a light blue color and is odorless. It is used for resuscitation, welding, as rocket fuel, and in many industrial processes.

REASON FOR CITATION

- * **Oxygen** is on the Hazardous Substance List because it is cited by DOT.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

Oxygen is naturally present at a concentration of 21% in the air we breathe. The effects described in this Fact Sheet may occur when breathing pure **Oxygen** or concentrations greater than 40%.

- * Minimum acceptable breathing air contains **19% Oxygen**.
- * Always monitor **Oxygen** levels before entering tanks, vessels, or other confined spaces.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Oxygen** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Oxygen**:

- * Contact with liquid **Oxygen** can cause severe skin and eye irritation and burns as well as frostbite.
- * Breathing pure **Oxygen** at high pressures can cause nausea, dizziness, tingling feelings in the hands and feet, muscle twitching, vision loss, convulsions (fits), and loss of consciousness.
- * Breathing pure **Oxygen** for a longer time can irritate the throat and lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema) a medical emergency, with severe shortness of breath.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Oxygen** and can last for months or years:

Cancer Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, pure **Oxygen** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, pure **Oxygen** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * **Oxygen** has not been tested for other chronic (long-term) health effects.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following may be useful:

- * Consider chest x-ray after acute overexposure to pure **Oxygen**.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures

Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA Standard: *1910.104*.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * On skin contact with liquified **Oxygen**, immerse affected part in warm water.
- * Workers whose clothing has been contaminated by liquefied **Oxygen** should change into clean clothing promptly.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs

done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Where exposure to cold equipment, vapors, or liquid may occur, employees should be provided with special clothing designed to prevent the freezing of body tissues.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear splash-proof chemical goggles and face shield when working with liquified **Oxygen**.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Entry into **Oxygen** enriched atmospheres (greater than 21% **Oxygen**) is highly dangerous. NFPA regulation 53M should be consulted.

HANDLING AND STORAGE

- * Prior to working with **Oxygen** you should be trained on its proper handling and storage.
- * A regulated, marked area should be established where liquified or compressed **oxygen** is handled, used, or stored.
- * Liquid **Oxygen** must be stored to avoid contact with ORGANIC COMBUSTIBLE MATERIALS (such as OIL, GREASE and COAL DUST) since violent reactions occur.
- * **Oxygen** gas evaporating from liquid or from **oxygen** enriched environments is easily absorbed into clothing and any source of ignition (such as a static spark) can cause flash burning.
- * Compressed **Oxygen** cylinders must be securely stored separately from fuel cylinders.
- * Liquid **Oxygen** tanks should be stored outdoors.
- * Sources of ignition such as smoking and open flames are prohibited where **Oxygen** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
- * See OSHA Standard 1910.104 and NFPA 51 for detailed handling and storage regulations.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health and
Senior Services
Occupational Disease and Injury Services
Trenton, NJ 08625-0360
(609) 984-1863

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health and Senior Services physician who can help you find the services you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

- * It may be necessary to contain and dispose of **Oxygen** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
- * If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- * **Oxygen** is not flammable but supports combustion and greatly increases the intensity of any fire. Mixtures of liquid **Oxygen** and any fuel are highly explosive.
- * Extinguish fire using an agent suitable for type of surrounding fire. **Oxygen** itself does not burn.
- * If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

If **Oxygen gas** is leaked, take the following steps:

- * Restrict persons not wearing protective equipment from area of leak until clean-up is complete.
- * Remove all ignition sources.
- * Ventilate area of leak to disperse the gas.
- * Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.

If **liquid Oxygen** is spilled or leaked, take the following steps:

- * Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete.
- * Remove all ignition sources.
- * Ventilate area of spill or leak.
- * Use water only. DO NOT USE CHEMICAL or CO₂ extinguishers.
- * Keep combustibles (WOOD, PAPER, OIL, etc.) away from spill.
- * Allow liquid **Oxygen** spills to evaporate.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

HANDLING AND STORAGE (See page 3)

FIRST AID

In NJ, POISON INFORMATION 1-800-962-1253

Eye Contact

- * Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

- * Immerse affected part in warm water. Seek medical attention.

Breathing

- * Remove the person from exposure.
- * Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
- * Transfer promptly to a medical facility.
- * Medical observation is recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.

PHYSICAL DATA

Water Solubility: Liquid **Oxygen** sinks and boils in water

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES

Right to Know Program

CN 368, Trenton, NJ 08625-0368
(609) 984-2202